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Journal of the Society of Arts.

FRIDAY, FEBRUARY 19, 1858.

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TENTH ANNUAL EXHIBITION OF INVENTIONS.

Monday, the 5th of April, is fixed for the opening of the Society's Tenth Annual Exhibition of *recent* Inventions.

Persons intending to contribute to the Exhibition should communicate with the Secretary of the Society of Arts as soon as possible, stating—

1. The title of the Invention.
2. Whether the article will be a Specimen, Model, or Drawing.

Articles for exhibition must be forwarded to the Society's House, Adelphi, London, W.C., *carriage paid.*

The days for receiving articles are, Thursday, the 18th; Friday, the 19th; and Saturday, the 20th of March; and no articles can be received after the last of these days.

All articles should be accompanied with a brief but clear description of the invention, with a wood-block (when possible) for illustrating the Catalogue, and a reference to any publication in which the Invention is described.

All drawings exhibited must be framed.

SPECIAL PRIZE.

A Prize of Twenty Pounds (placed at the disposal of the Council for this purpose by the Rev. F. Trench and J. MacGregor, Esq.,) and the Society's Silver Medal, is offered for a Writing-case suited for the use of Soldiers, Sailors, Emigrants, &c. The attention of those intending to compete for this prize is directed to the following points, which will influence the Council in making their award :—

Lightness,
Smallness of size,
The avoidance (if possible) of fluid ink,
Durability,
Cheapness, with a guaranteed supply, and
General applicability to the duties, habits, and requirements of the above classes.

The articles sent in for competition must be delivered at the Society's House, Adelphi, London, W.C., on or before the 8th May next.

EXAMINATION PRIZE FUND FOR 1858.

The following additions have been made since the last announcement :—

John Ames	£5	5
William Hawksworth	1	1
James Holmes	1	1
William T. Radford	1	1

COMMITTEE ON THE PATENT LAWS.

The Council have re-appointed the Patent Law Committee of 1856, and the following gentlemen, who formed the Committee at that time, have been requested to serve again :—

W. Bridges Adams.
John George Appold, F.R.S.
W. G. Armstrong, F.R.S.
Samuel Holden Blackwell.
J. M. Blashfield.
John Braithwaite.
Jacob Brett.
Joseph Burch.
F. Crace Calvert.
Dugald Campbell.
Robert Lucas Chance.
Edwin Clark.
Henry Cole, C.B.
Charles Cowan, M.P.
Frank Crossley, M.P.
Thomas De la Rue.
Bryan Donkin.
William Ewart, M.P.
William Fairbairn, F.R.S.
Robert Fletcher.
Benjamin Fothergill.
Sir Charles Fox.
Dr. J. H. Gilbert.
Joseph Glynn, F.R.S.
Prof. Graham, F.R.S.
Peter Graham.
Warren S. Hale.
Henry Hensman.
John Hick.
Edward Highton.
A. C. Hobbs.
S. C. Homersham.
A. H. Houldsworth.
William Hutt, M.P.
Capt. L. L. Boscawen Ibbetson, F.R.S.
Owen Jones.
John Bennet Lawes, F.R.S.
George Lowe, F.R.S.
Sir John Macneill, F.R.S.
Henry Maudslay.
Charles May.
Henry Medlock.
J. E. McConnell.
John Joseph Mechi.
Herbert Minton.
Robert S. Newall.
Thomas Page.
Sir Joseph Paxton, M.P.
John Penn.
Ainger M. Perkins.
Richard Roberts.
Titus Salt.
Charles W. Siemens.
Lord Stanley, M.P.
Robert Stephenson, M.P., F.R.S.
Colonel Sykes, F.R.S.
J. P. Brown Westhead.
Prof. Wheatstone, F.R.S.
Joseph Whitworth.
George Fergusson Wilson, F.R.S.
Edward Woods.
Matthew Digby Wyatt.
T. H. Wyatt.

SOULAGES COLLECTION.

The Council have appointed a Deputation to join with the Institute of British Architects, and wait upon Lord Palmerston and the Chancellor of the Exchequer, to urge upon the Government the propriety of securing the Soulages Collection for Public Instruction. The Members named as the Deputation are the following :—

Beriah Botfield, M.P.
Dominic Colnaghi.
William Cubitt, M.P.
Warren De la Rue, F.R.S.
Henry Drummond, M.P.
William Ewart, M.P.
Viscount Goderich, M.P.
George Godwin, F.R.S.
F. Seymour Haden.
Henry Thomas Hope.
Owen Jones.
Joseph Locke, M.P.
George Moffat, M.P.
J. A. Nicholay.
Sir John Pakington, Bart., M.P.
Sir Joseph Paxton, M.P.
William Roupell, M.P.
Sydney Smirke.
J. Jobson Smith.
Lord Stanley, M.P.
William Tite, M.P.
Matthew Uzielli.
John Webb.
James Whatman, M.P.
Thomas Winkworth.
M. Digby Wyatt.

Together with the Presidents of Institutions in the manufacturing districts.

EXAMINATIONS.

The following letters relating to the Examinations are published, with notes of the replies, for the information of those who may be desirous to receive explanations on the various points raised by the writers :—

Berkhamsted, Feb. 5, 1858.

Sir,—In reply to your letter of the 30th ult., in which you desire to know what arrangement we have made in regard to the Society's Examinations, I beg to say that a Local Board has been formed, and several candidates have presented themselves, but the Board are of opinion that they are not (1) sufficiently advanced to bear the Society's Examination this year, but they give promise of being able to do so next year.

I am, &c.,
HENRY NASH, Hon. Sec.

Mechanics' Institute, Bradford, Yorkshire, Feb. 6th, 1858.

Dear Sir,—In connexion with the (2) Yorkshire Union we have made Bradford a local centre for this district, and have taken steps to form a Local Board of Examiners. Should any difficulty present itself, we shall be very glad to avail ourselves of your advice and assistance.

I am, &c.,
M. H. WALLS, Secretary.
P. Le Neve Foster, Esq.

75, Lansdowne-place, Brighton, Feb. 3rd, 1858.

Sir,—A committee has been appointed in Brighton, for the purpose of forming a Local Board of Examiners in connexion with the Society of Arts; can you, therefore, kindly inform me how many and what (3) Societies in Brighton are actually in union with your Society?

I am, &c.,
BARCLAY PHILLIPS, Acting Sec., *pro tem.*
P. Le Neve Foster, Esq.

Bristol Athenæum, 26th Jan., 1858.

Dear Sir,—Please inform me how you interpret clause 16 of the Examination programme (4). Does it mean that the candidates must be members or students in a class connected with the Institution, or that they must be either students in such a class, or members of the Institution; in other words, are members of the Athenæum, or other Institutions, eligible to compete, if not students of any class connected with it also? This is rather important to us, as many of the probable candidates are not now studying with either of our classes.

Can you supply me with some more copies of your last published programme (5), or can we purchase them of the publisher, if so, what would they cost us per 100? Please favour me with replies per return, for on Thursday I have a meeting of the committee, and should like to show them a copy of the announcement which will appear in the Saturday papers. At the same time, pray also favour me with any information (6) as to the number of firms who have agreed to accept, preferably, certificated applicants for situations, the arrangements for prizes this year, and other inducements to competitors (7) which we may embody in our advertisements, and thus, as far as possible, forestal and avert the trouble of reading and answering repeated questions from me.

I am, &c.,
J. W. DANIEL.

If we have lady applicants (as will probably be the case) from our Ladies' Classes, are we to examine them or no? (8).

Working Man's College, Halifax, Feb. 5th, 1858.

Dear Sir,—In answer to your inquiries of the 4th inst., I beg to inform you that we have made every arrangement for giving the members of this Institution the advantage of admission to the previous and final examinations described in the programme which has been sent us by the Council of the Society of Arts.

Our previous Examination, and also the Examination in the special subjects, will take place in the last week in February, and on the 26th we propose to send a list of the candidates for examination to the Council, as required (9). We have established a most efficient Local Board. We have no fear that it will be unable to carry out the intentions of the Council of the Society of Arts, but, at the same time, I must add, that it is the unanimous opinion of the managers of this Institution, that the final examinations will fail in their object, unless they are conducted in the presence of an examiner (10) sent down by the Society of Arts. I am, &c.,

C. R. HOLMES.
The Secretary of the Society of Arts.

Institutional Association of Lancashire and Cheshire, Central Committee, Manchester, 1, Market-place, 9th Jan., 1858.

Dear Sir,—Our Council has just had its usual monthly meeting, and has instructed me to say, in reply to your three queries of the 4th inst. 1. The Examinations will be held at Preston and Manchester. 2. None, excepting Liverpool, which would probably form a good Local Board. 3. We do not know of any difficulties to be removed by either your Council or ours.

I can only repeat the desire of our Council to work in harmony with yours.—I am &c.,

DAVID MORRIS, Hon. Sec.
P. Le Neve Foster, Esq., London.

Liverpool Institute, February 10, 1858.

Dear Sir,—I have delayed answering your note of the 5th inst., until I received a reply from a body of gentlemen whom the Directors had previously asked to act as our Local Board of Examiners.

I have now the pleasure to inform you, that the Professors of the Queen's College, which, as you are aware, is associated with the Institute, have consented to form a Board of Examiners for this Institute, and such of the neighbouring Institutes as may choose to take advantage of the arrangement.

These gentlemen are:—The Rev. Henry Griffiths, the College Professor of Logic and Ethics; Donald Cameron, Esq., M.A., Professor of Greek and Latin, and Grecian and Roman History; James Elliot, Esq., Professor of Mathematics and Natural Philosophy; Rev. James Cranbrook, Professor of the English Language and Literature; M. Husson, Professor of French; Dr. Carl Retslag, Professor of German; Rev. D. M. Isaacs, Professor of Hebrew; George Hamilton, Esq., F.C.S., &c., Professor of Chemistry; Isaac Byerly, Esq., F.R.C.S., F.L.S., Professor of Physiology; T. C. Archer, Esq., Professor of Botany.

With reference to the kind offer expressed in your letter of aid to surmount any difficulties we might experience, I have only to thank you for it.

That letter and your Programme are so full and so clear as to leave nothing to be desired in the way of information, except on points of minor importance, not to be called difficulties, such as, who, in Institutes constituted like ours, come within the meaning of the term "member," as used in paragraph 16; and such also as is referred to in the Programme, to secure as nearly as possible uniformity (11) of value in the "passes."

The Programme seems to me to contain unanswerable replies to every doubt that might be advanced respecting the superior merits of this scheme, as compared with that of last year. It cannot be denied that *vivâ voce* examinations afford valuable tests, which are wanting in examinations by papers; but, I believe, it is equally unquestionable that this year's plan will far more nearly approach the accomplishment of the Society's object in instituting the Examinations than would have been at all possible under the former scheme, the operations of which could never have extended beyond very narrow limits.

On reading the Programme, I was much surprised by its complete adaptation to its purpose. This could scarcely have been accomplished without very much thought and labour. Possible practical difficulties, such as almost always reveal themselves in the working out of any scheme, must have been well considered before a plan could have been produced so free from them, as I feel sure this will prove to be, so simple in its machinery, and yet so calculated to suit all the numerous and various conditions to which it is intended to be applied.

Of course, the standard and subjects of the examinations will scarcely be what each Institute would have desired, and they will doubtless be varied as experience may suggest; but, in the present circumstances, they are the best arrangements which, in my opinion, could have been made. The Society richly deserves the best thanks of the Institutes for its labours in this matter.

I should state that Dr. Hume, your Honorary Local Secretary for Liverpool, lately delivered a very able, interesting, and encouraging address to our students, in reference to the plan of Examinations. It was given at our annual meeting; and an abstract of it, if not the whole, will be printed with our annual report, a copy of which I will shortly send to you.

* * * * *

I am, &c.,
ASTRUP CARISS, Secretary.

P. Le Neve Foster, Esq.

Mechanics' Institution, Louth, 4th Feb., 1858.

DEAR SIR,—The committee have appointed five of their members the Local Board of Examiners for the Society's Examinations. It would be impossible to select five others more qualified for the office than those gentlemen they have selected. Two of them are principals of large educational establishments, one is a barrister, one is a surgeon, and the other is the President of the Institution, a Dissenting Minister; both of the latter are distinguished by their great scientific attainments. We have published a small handbill, in order to make the Examinations generally known, a copy of which shall be sent you.

Will you be good enough to send me five copies of the programme for the Local Board.—I am, &c.,
B. CROW, Hon. Sec.

P. Le Neve Foster, Esq.

Mechanics' Institute, Northowram, Halifax, Feb. 11, 1858.

DEAR SIR,—I am duly in receipt of your circular letter of the 8th instant, and brought the subject of the Examinations, together with your letter, before the monthly meeting of the directors of this Institution last evening.

We shall be able to present for examination by the Society's Examiners, at least, one member of this Institution, who will be willing to undergo an examination in arithmetic, algebra, mensuration, and bookkeeping. As our Institution lies at a distance from any other one, and the directors are of opinion that there are gentlemen in the neighbourhood competent to undertake the duties of Examiners, they have decided to form a Local Board of their own, to consist of the following gentlemen:—William Moore, Esq., The Rev. W. H. Wawn, M. A., and Mr. Michael Washington; and I shall be happy, until further arrangements are made, to form the means of communication between these gentlemen and yourself. The Local Board will be prepared to conduct the previous Examination in Easter week, and to superintend the final examinations during Whitsuntide. In the meantime they will feel obliged if you will keep them informed of any proceedings of the Council in reference to these Examinations, and will be grateful for any suggestions with which you may favour them.

Has not geography (12) been recently added to the subjects in which the candidates are to undergo a previous examination, and is it not a subject in which much difference of opinion may exist as to what will be sufficient to enable a candidate to pass?

I shall esteem it a favour if you would give me your opinion as to what is intended to be the nature of the Examination in this subject.—I am, &c.,
JOHN W. WOOD, Hon. Sec.

P. Le Neve Foster, Esq., Society of Arts.

Gibson-street, Newcastle-on-Tyne, Jan. 15, 1858.

SIR,—In reply to your queries of the 4th January, I have to state, in reference thereto, 1. At Newcastle, as the most central place in the four northern counties.

2. I do not think you can, because there are very few classes connected with the Institutions. Classes are generally conducted by private teachers as night schools.

3. I do not think you can. The Societies in the North are not educational so far as classes are concerned, nor have they any accommodation for making them so. The returns to us from 55 Institutions, show that there were only 16 classes, and the total number of pupils entered 263, and the attendance of these not satisfactory. The classes best attended are French and German, because, in seaport towns, a knowledge of these languages is necessary to procure situations of trust in merchants' offices, and then the persons who attend these classes are not mechanics or the working classes.

The classes in the North of England Societies are not in a satisfactory condition, and where they do exist they are by no means in a flourishing state, and hence I imagine that you can be of little use.

I am, &c.,
J. D. THORNTON, Hon. Sec. Northern Association of Literary and Mechanics' Institutions.

Meyrick-street, Pembroke Dock, 11th Feb., 1858.

SIR,—Having been appointed a member of the Local Board of Examiners for this Institute, I am requested by my colleagues to make some inquiries for our guidance. It is stated that the previous examination shall take place twelve weeks before Whitsuntide. Cannot this requirement be a little relaxed? (13) In the letter received by the Secretary of the Institute this week, geography is named as one of the preliminary subjects, although it is not named as one in the programme. (14) It is also stated in that letter that the previous Examination is to be partly *vivâ voce*. Is that necessary, or is it optional? (15) The most important points, however, are the nature of the questions to be set—the amount of difficulty they should involve—the mode of determining the value of the solutions (16) and the standard to be reached in order to secure a "pass."

We shall be most happy to receive all the information you can give us on these points. In my own opinion the nature of the questions, the marks awarded, and the standard to be reached should, if possible, be uniform throughout the country.

In the next place we require to be informed to what extent the *special subjects* (17) should be examined in at the previous Examination?

Candidates are also asking such questions as these:—May they take one special subject; or must they take three? Is Mathematics considered as one special subject, or is each subdivision a special subject? If Mathematics be regarded as one subject, must all the subdivisions be taken up? May they take up Roman History without the Latin Language? (18)

Be so kind as to reply to the above as early as convenient, and to give us any other information likely to be useful.

Can you also supply us with a few copies of the programme for the use of the Examiners, and also for distribution?

I am, &c.,
JOHN T. COCK.

P. Le Neve Foster, Esq.

Pembroke Dock Mechanics' Institute, 11th Feb., 1858.

SIR,—We have chosen three persons as Examiners, two of them being schoolmasters; there are several members who have expressed themselves desirous of undergoing an examination, but there are a few questions I am desired to ask.

It is stated in the programme or pamphlet we have received that a person will not be examined in *more* than three subjects. Can he take up less?

Again, in taking up one subject, will the examination include questions in all the *subdivisions* of the subject, as in Mathematics; can the candidate select *one* of its subdivisions, as Algebra, or must he be prepared *in all*, including Conic Sections, Mensuration, Trigonometry, and Geometry?

Again, in Latin and Roman History, can one take up the Roman History without the Latin, and so on with the other subjects? You say that the previous Examination will be by papers and *vivâ voce*. Are these papers received from you or prepared by the Local Board themselves? (19)

Would you be kind enough, with your answer, to enclose two or three of the pamphlets relative to this subject?

I am, &c.,
A. W. NIELE, Secretary.

London Mechanics' Institution, Southampton-buildings, 4th Feb., 1858.

Sir,—In reply to your communication of the 15th January, on the formation of Local Boards of Examiners, I am directed by the Committee of Managers of this Institution to inform you that they are prepared to form a Local Board of Examination for our own members, and for those of other Institutions who may be willing to join them.

I am, &c.,
ANDREW M'FARLANE, Secretary.
P. Le Neve Foster, Esq.

London Domestic Mission Reading-room, Chapel-street, Cripplegate, Feb. 2, 1858.

Sir,—In reply to your circular on the subject of Local Boards, I am to inform you that it is the intention to form a Board of Examiners at this place, for the benefit of such of our members as may be willing and able to attend the next examination of the Society of Arts.

I am, &c.,
M. WADE, Hon. Sec. Reading-room.
P. Le Neve Foster, Esq.

People's College, Sheffield, Feb. 2, 1858.

Dear Sir,—I beg to inform you that the General Committee for the Examinations in Sheffield have formed a Board of Examiners, consisting of the following gentlemen:—The Rev. E. Ward, the Rev. E. Sandford, and Dr. Elam. If you have any communication to make to them with regard to the Examination, I should be happy to forward any letters you may send, as I think it necessary they should be in direct communication with you.

I remain, &c.,
THOS. ROWBOTHAM, Sec. to the Committee.
P. Le Neve Foster, Esq.

Sheffield Mechanics' Institution, Feb. 10, 1858.

Dear Sir,—In reply to yours of yesterday, our arrangements are all made; Local Committee and Examiners appointed. The Secretary is Mr. Thomas Rowbotham, of the People's College, from whom you will, no doubt, shortly hear.

I am, &c.,
HY. WOSTENHOLM.
P. Le Neve Foster, Esq.

Notes of Replies to the foregoing Letters.

Berkhampstead.

1. Though none of the candidates may be sufficiently advanced to bear the Society's Final Examinations this year, it is expedient that as many as possible, if not all of them should undergo the Previous Examination of the Local Board. This will be, for all parties, a good preparation for the next year.

Bradford.

2. The Committee of the Yorkshire Union have announced that arrangements are made for Local Boards to hold Examinations at Leeds, Bradford, Hull, York, Selby, Halifax, Middlesborough, Sheffield, and Wakefield.

Brighton.

3. The Institutions at Brighton in union with the Society of Arts are the following:—

Athenæum and Young Men's Literary Union.
London, Brighton, and South Coast Railway Literary and Scientific Institution.
Mechanics' Institution.
Royal Literary and Scientific Institution.

The Local Board includes representatives of all those Institutions.

Bristol.

4. Candidates for admission to the final Examinations may be either members of an Institution in union with this Society, or members of a class belonging to such an Institution. Members of an Athenæum in union are admissible to the Examiners without being members of a class in the Athenæum.

Copies of the programme may be had on application to the Secretary, Society of Arts, Adelphi, London, W.C.

6. The Declaration, signed by employers of labour in favour of candidates for employment who are certificated by this Society, may also be had on application to the Secretary.

7. The list of prizes, &c., for 1858, will shortly be published and distributed to the Institutions.

8. The Examinations are not limited to one sex.

Halifax.

9. The previous Examinations must be held by the Local Boards in time to allow the results to be communicated to the Council five weeks before Whitsuntide.

10. The final Examinations cannot possibly be conducted in the presence of an Examiner sent down by the Society of Arts. The Council have already received information of the intention to hold Examinations at more than 30 places, and the number increases daily. What is required at each place of final Examination is, not an Examiner—for the setting of the papers of questions, and the passing of judgment on the written replies, will be entirely done at the Adelphi—but the presence of two or three persons possessing the confidence of the Institutions, and authorized by them to superintend the working of the papers. These superintendants need not be persons of literary or scientific celebrity. They must be above suspicion of partiality. They will have to certify to the Council that they have been present throughout the Examinations, and have seen that the replies to the printed questions were written by the candidates without copying or prompting, or the use of books or notes, or any other assistance. These are simple duties, but they must be discharged with fidelity and firmness. If in any case the local authorities are not satisfied that they can get these duties discharged without external assistance, they will do well to seek the co-operation of some person or persons (of whom there are many) who are accustomed to such Examinations. The Council cannot assist the Local Boards to procure the services of such persons, because the Council, through their Central Board of Examiners, are the final judges in the competition, and, therefore, cannot take part in the local arrangements. If, however, the local authorities, in any case, having selected the superintendants of their Examinations, should desire them to call at the Society's House for such explanations of their duties as can be given to them, the Council will readily afford all the information in their power. It must, however, never be forgotten that the object to be kept in view in these arrangements is, not to establish a highly centralized system, but to develop the growth of local energies and local authority in education.

Liverpool.

11. When the Examinations of this year are concluded, the Council will enter into unreserved communications with the Local Boards, and will point out those cases in which the "pass" may appear to have been given with too much facility.

Northowram.

12. See note 14.

Pembroke Dock.

13. See note 9.

14. Geography is a special subject in the Programme. A previous examination in geography is required in those cases alone in which the candidate takes up geography as a special subject.

15. The previous Examination must obviously be oral in "reading," and written in "writing." Beyond these all is left to the discretion of the Local Boards. They may use written or oral tests in any proportion that they judge best.

16. The Council do not wish to prescribe uniform and positive rules on these points. Any inequalities in the value of the "passes" can best be corrected when the Examinations have been held, or when it has been seen what the different Boards have done, and with what results. The Council, however, will be most happy to give at any time any advice or explanations which any Local Board or individual member of it may desire.

17. All that is necessary is that the Local Board should satisfy itself that the candidate has a fair knowledge of the special subject. The Local Board, at the previous Examination, need not exactly guage the attainments of the candidates. It is, however, desirable that this should be done wherever it is possible. It is desirable that the Local Boards should have a real substantive character; should pass definite judgments on their candidates, and award certificates and prizes. It is desired that they should have a real authority of their own, and should rather co-operate as substantive bodies with the Society of Arts than merely as accessaries to the Central Board.

18. Candidates may be examined at the previous Examination in any subjects, and to any extent, that the Local Boards may determine. Candidates may be examined at the Final Examinations in any of the subdivisions of any one, two, or three of the twelve principal subjects of the programme. In Mathematics there are eight separately specified subdivisions of the principal subject. Candidates may take up the whole, or any subdivision, of any three subjects. Candidates may take up Roman History with or without Latin.

19. If the Local Boards generally should desire the Council to furnish them with printed papers for the previous Examinations, the Council will be happy to do so next year.

ELEVENTH ORDINARY MEETING.

Wednesday, Feb. 17, 1858.

The Eleventh Ordinary Meeting of the One Hundred and Fourth Session, was held on Wednesday, the 17th inst., William Odling, Esq., M.D., in the chair.

The following Candidates were balloted for and duly elected members of the Society:—

Abernethy, James
Cawley, Charles Edward
Figgins, James, jun.
Fleming, Thomas
Howard, James
Ripley, Henry William
Spencer, John Frederick.

The Paper read was:—

ON RECENT SCIENTIFIC DISCOVERIES AS APPLIED TO ARTS AND MANUFACTURES.

By Mr. Crace Calvert.

On Colour obtained from Coal Tar Products.

When, in November 1854, I had the honour to read before this Society a paper on the products obtained from coal, I stated that ere long, besides carbo-azotic acid, some valuable dyeing substances would be prepared from this mineral. This expectation has been fulfilled. Messrs. W. Perkins and A. H. Church have obtained several blue colouring substances from the alkaloids of coal tar, and one from naphtaline, named by them Nitroso-phenyline and Nitroso-naphthyline, &c.

Mr. Perkins has lately taken a patent for the commercial application of some of these beautiful purple blue colours, which he has succeeded in fixing on silk, a sample of which I have the pleasure to lay before you. This fine colour, which rivals the delicate and admired colour of orchil, has this great advantage over it, that it is not destroyed by light; Mr. Perkins has, therefore, solved one of the problems of the art of dyeing, viz., the production of a fast colour similar to the fugitive one of orchil. Mr. Perkins's process consists in dissolving in water the sulphates of aniline, of cuminine, and of toluidine, and adding a quantity of bicromate of potash sufficient to neutralize the sulphuric acid in these sulphates. The whole is left to stand for twelve hours, when a brown substance is precipitated, which is washed with coal tar naphtha, and then dissolved in methylated spirits. This solution, with the addition of a little tartaric or oxalic acid, forms the dyeing liquor of Mr. Perkins.

Mr. Charles Lowe and myself have lately been fortunate enough to obtain from coal tar, products having a most extraordinary dyeing power, and yielding colours nearly as beautiful as safflower pinks and cochineal crimsons; and what increases the interest of this coal tar product is, that by the process we have discovered, we can obtain with it, on a piece of calico mordanted for madder colours, all the various colours and shades given by this valuable root—violet, purple, chocolate, pink, and red. The only thing which has prevented us from introducing into the market the crown red inodorous paper which we prepare, has been, that it is as yet too expensive to compete with this extraordinary colour-giving root, but we intend pursuing our researches in the hope of employing it as a substitute for safflower or cochineal, two colouring matters, the price of which is sufficiently high to induce us to continue our investigations. We may add, that our imitation of safflower colour stands soap and light, whilst safflower colours do not.

I shall now draw the attention of the meeting to the preparation, dyeing, and printing of a magnificent crimson colour, called murexide, obtained from guano, a substance which, until lately, has been entirely imported for agricultural purposes. The interesting application of this colour to calico-printing has been, like many valuable chemical discoveries, progressive, and has only been brought to successful commercial application by successive discoveries, made by various persons.

Prout was the first chemist to remark that if the fœces of serpents were heated with nitric acid, and a little ammonia added, a beautiful purple colour was produced. He named it purpurate of ammonia. This substance, when dry, has the appearance of a dark-red powder, soluble in water, to which it communicates a magnificent red colour. This solution not only gives a precipitate with metallic salts, but when evaporated yields beautiful crystals, having the iridescent appearance of the wings of cantharides.

This discovery has also been useful to medical men, by enabling them to distinguish the uric acid calculi.

Messrs. Liebig and Wöhler had also investigated the subject, and succeeded in obtaining from the uric acid contained in the fœces of serpents this substance, which they called murexide, and a new class of organic substances, the knowledge of which has much facilitated the application of murexide to dyeing and *printing*. Mr. Saac was the first to apply the products of uric acid to the dyeing of fabrics; his process consisted in dipping woollen fabrics, prepared with a salt of tin, into a weak solution of alloxan, a product discovered by Liebig and Wöhler, in heating urea with nitric acid. The fabric so prepared was dried, and when submitted to heat a fine crimson was generated, the intensity of which was increased by the fumes of ammonia. But owing to the difficulty of obtaining a colour of uniform shade, Mr. Saac's process required improvements, and these have been effected by Mr. Schlumberger.

The process followed by Messrs. Saac and Schlumberger, could not be applied to silk or cotton fabrics. The method of dyeing silk with murexide was discovered by M. de Pouilly, who adopted the following processes, viz., dipping the silk in a concentrated solution of bichloride of mercury mixed with murexide, squeezing the silk well and hanging it in the air, when a magnificent crimson insoluble compound is fixed on the silk. This effect is produced from the fact that when solutions of bichloride of mercury and murexide are mixed together, an insoluble compound is only formed after the lapse of an hour or two.

The process for dyeing cotton is due to Messrs. Lauth and Schlumberger, and consists in producing on cotton a purpurate of lead by mordanting with nitrate of lead, passing into an alkali, and then dyeing in a solution of murexide; in order to give full brilliancy to the colour, it is lastly passed through a weak solution of bichloride of mercury. This process was further improved by Messrs. Dolfus, Meig and Co., in France, and Mr. Lightfoot, in Lancashire, by printing murexide with an excess of nitrate of lead, and subjecting the cloth so printed to the action of ammoniacal fumes, or passing it through a solution of caustic soda mixed with sal ammoniac. In order to render this substance more generally useful, it remained to find a method for obtaining fast colours with it on mixed fabrics, such as mousseline de laine, and this has also been effected by Mr. Schlumberger. The cloth is first prepared by uniting binoxide of tin with the wool. This object is attained by using a salt known to calico printers as pink salt, the double chloride of ammonium and tin, and then printing on the prepared fabric the following mixture:—

1 part of murexide.
6 parts of nitrate of lead.
2 parts of nitrate of soda.

The pieces are then allowed to age for two or three days, when, to fix the purpurate of lead on the cotton, and the purpurate of ammonia on the wool, it is necessary to pass the cloth into a bath of bichloride of mercury, composed as follows:—

Water	100 gallons
Bichloride of Mercury	6 pounds.
Acetate of Soda	12 pounds.
Acetic Acid	2 quarts.

Until recently, all the green colours produced on fabrics were the results of blue and yellow mixed together; but of late public attention has been drawn to a green matter discovered by the Chinese, and fixed by them on cotton. It has been ascertained that they prepare it, by a long and tedious process, from two plants called Pa-bi-lo-za (*Rhamnus chlorophorus*) and Hom-bi-lo-za (*Rhamnus utilis*), and sell it in small square cakes, under the name of Luh-kaou or Luh-chao. The first commercial importation of this colour, new to us, is quite recent, as the first public sale of it in England took place a week ago, at the quarterly indigo sales, under the name of China green indigo. No sooner had a foreign green substance been brought to our notice, than in Europe we had succeeded in obtaining also a green dyeing substance from the plants which surround us, and Mr. Schlumberger has been fortunate enough to fix on woollen fabrics the green chlorophylle, or colouring matter of leaves and grass. This discovery will, in time, prove of great service to dyers and calico printers. Mr. Schlumberger's process consists in boiling 60 lbs. of grass with 25 gallons of water. This operation is repeated, and the grass then treated with 25 gallons of soda lye, with addition of 2 to 4 lbs. of Mercer's dung substitute (phosphate of soda and lime). Boil half an-hour, and then add excess of hydrochloric acid; a green precipitate falls, which is separated by filtration. The precipitate is dissolved in very dilute soda lye, adding a little of the substitute, and the silk or wool to be dyed is dipped in until the desired shade is obtained. Stannate of Soda is the only mordant which gives any beneficial results.

M. Pelouze has rendered lately a great service to Turkey red dyers by enabling them to use any oil, instead of only Gallipoli oil, and this of special quality. M. Pelouze has discovered that the difference there was betwixt a Gallipoli oil, which could be employed with advantage to produce a Turkey red on cotton, and one which could not, was, that the first contained a large proportion of free fatty acids, whilst the latter was nearly neutral. This led Mr. Pelouze first to prepare, artificially, oils of good quality for Turkey red by mixing oleic acid with neutral oils; and, secondly, to the interesting scientific observation that oils were susceptible of undergoing a spontaneous fermentation as well as saccharine juices, or other organic fluids. Thus, immediately the neutral fatty matters in the cells of fruits or roots are brought in contact with the ferment which all vegetable substances contain, by breaking the cells in which the fatty matters are deposited, the oil enters into fermentation, and the fatty acids are liberated from the glycerine with which they had been combined. This discovery gives us an insight into the acidity of some oils and the rancidness of others.

Patent Gum.

One of my late assistants, Mr. Edward Hunt, has just patented a discovery of much value to several trades, and especially to calico printers, who employ large quantities of various preparations of farina, sago, wheat, starch and flour, as a substitute for gum arabic, to thicken the mordants and steam colours. We shall better appreciate the value of the discovery made by Mr. Hunt, when we reflect that hundreds of tons of the above preparations are employed annually, and that most of the substances used are articles of food, for by this discovery a great saving in quantity is effected, two pounds of Mr. Hunt's gum thickening as well as three pounds of ordinary calcined farina. This new gum presents also the three following advantages, viz., being nearly white, perfectly soluble in cold water, and this solution not being acid. The patent gum is manufactured by adding to one ton of dry farina 60 gallons of buttermilk, and calcining the whole in the ordinary way. Strange to say, the action of the lactic acid on the caseine and albumen of the buttermilk, is such as to render them, as well as the farina, soluble in water.

Sulphurous Acid.

The application of this acid to manufactures has been much impeded by the difficulty which the preparation of its solution presents on a large scale; for the production of sulphurous acid, as given in books, is always dangerous, especially when its solution has to be prepared in large quantities. This difficulty I have overcome by a process which I here give to the public, and which enables me to prepare thousands of gallons per day of a saturated solution. The process consists in burning sulphur in a small furnace, and conducting the acid gas through earthenware tubes, surrounded with water so as to cool them. It is then made to ascend through a wooden column, 40 feet high and about 4 feet wide, filled with pumice stone which has been previously washed with muriatic acid and then with water. Whilst the acid ascends through the porous pumice stone, it meets a certain and known quantity of water descending, which dissolves the acid; by opening, more or less, a valve at the top of the column, a more or less rapid current is established. With a little care, a saturated solution runs out constantly from the bottom of the column into a confined reservoir, in which it is stored for use until required.

Refining of Sugar.

I was led to apply the above process, from a wish to use sulphurous acid in sugar-refining, convinced that it would be far superior to the sulphite of lime (which was so strongly recommended, a few years ago, by MM. Dumas and Melsens), because that by its volatility it would not remain in the syrups or molasses, and give them, as the sulphite does, a disagreeable taste, in consequence of the lime of the sulphite remaining in the syrup as acetate and lactate. These anticipations were not only realised, but I also found that sulphurous acid possesses two advantages for the sugar-refiner. 1st. That it stops the fermentation of his hot liquors as they come out of the char-filters; and 2ndly, when properly applied, it tends to prevent the re-colouration of the liquors during their concentration in the vacuum pan. In practice, I found that very successful results were obtained by adding two gallons of a saturated solution of sulphurous acid to every 100 gallons of decolourised liquor, as it left the char-filter, and was collected in tanks, until pumped up or run into the vacuum pan.

A M. Basset called the attention of the French Academy to a process which, he states, offers decided advantages. It consists in adding a solution of soap to that of molasses or sugar in the blowing-up pans. The following chemical action ensues. The fatty acids of the soap unite with the lime, which always exists in those impure sugar solutions even when lime has not been added by the refiner; and stearate of lime, as it falls, carries with it some of the colouring matters, thus facilitating the decolouration by the char. The alkali of the soap remains united with the acids which were previously combined with the lime.

Diseased Beers.

Several brewers of late have suffered by their beer becoming rapidly sour after it was barrelled, owing to an acetic fermentation succeeding an alcoholic one. I was consulted as to the best means of preventing this acid fermentation, and the process recommended by me is very simple and practical. It consists in the employment of sulphurous acid in solution or as a gas. But I found that mere sulphurization of the casks did not suffice. To ensure perfect success, it is necessary to soak well the fermenting vats and barrels, and also to thoroughly wash the coolers with a solution of sulphurous acid, in fact, all the various vessels used in a brewery should be treated by this antiseptic before satisfactory results are obtained.

On the Puddling of Iron.

Great numbers of patents have been taken out to effect improvements in puddling, either by modifying the form of the furnace, or by employing various chemical mixtures, and several of these investigations have led to the discovery of the manufacture of puddled steel by Captain Uchatius, Mr. R. Mushet, and Mr. E. Riepe. Whilst reading the interesting paper of Mr. W. Clay, which he communicated to this Society on the 15th of January, it occurred to me that some improvements could be effected in Mr. Riepe's process, as well as in some of the others, if attention was drawn to some results published by Mr. R. Johnson and myself on the chemical changes which pig iron undergoes during its conversion into wrought iron, for it will be observed in looking over the following table (which contains a *resumé* of our results) that it is unnecessary to add various mixtures to melted pig iron during its conversion into wrought iron to stop its complete conversion, and to produce puddled steel. If mixtures of various kinds of iron have been employed, or chemical mixtures added, it is because no one had undertaken the long and tedious analysis of the various chemical changes which pig iron undergoes during its melting, boiling, and granulation in the puddling furnace. To have an insight into the phenomena, we took samples from the melted mass contained in the furnace at every well-characterised stage of the operations, and these are the results of our investigations.

No. of Sample.	Time when taken.	Stage of the Operation.	Appearance of the Sample.	Carbon.	Silicium.
Pig-iron used	12.0		Grey No. 3, cold blast Staffordshire	2·275	2·720
1	12.40	Just after melting	White and brittle, like refined metal	2·726	0·915
2	1.0	Perfectly fluid	Same as last	2·905	0·197
3	1.5	Just on the boil	Black mass, composed of very small brittle granules	2·444	0·194
4	1.20	Full boil	Black swollen mass, composed of very small brittle granules	2·305	0·182
5	1.35	Just after boil	Black mass, composed of rather larger granules, which are slightly malleable	1·647	0·183
6	1.40	After the boil	Black mass, composed of much larger malleable granules	1·206	0·163
7	1.45	Globules welding together	Black mass, large malleable globules	0·963	0·163
8	1.50	Part of ball	Same as above, but the mass more compact	0·772	0·168
9		Puddled bar	Good quality	0·300	0·120
10		Wire	Good quality	0·111	0·088

Composition of the Iron used.

Carbon	2·275
Silicium	2·720
Phosphorus	0·645
Sulphur	0·301
Manganese and aluminium	traces
Iron	94·059
	100·000

Composition of the Scoria or Slag.

Silica	16·53
Protoxide of iron	66·23
Sulphuret of iron	6·80
Phosphoric acid	3·80
Protoxide of manganese	4·90
Alumina	1·04
Lime	0·70
	100·00

Without entering here into the chemical details of analysis, &c., I think it my duty to draw attention to several facts which the above results illustrate, viz., that the silicium in the cast-iron is oxidized during the softening and smelting of the pig iron, whilst the carbon remains stationary, or even increases, and that it is only after the boil that this substance is really removed from the iron. It is curious to observe that the cast-iron should remain in the furnace one hour, and in a fluid state for above 20 minutes, without losing more than a trace of carbon, whilst in the 20 minutes which follow (from 1.20 to 1.40), the cast-iron loses 50 per cent. of the carbon it contains, and if the partially melted mass now in the furnace were taken out, squeezed and rolled out, I have little doubt that it would be found to be puddled steel, for it would contain about the right proportion of carbon, viz., one per cent. Lastly, I would remark that the purpose of the early formation of the scoria, or slag, is to preserve the iron from a too rapid oxidation, and give time to the carbon to separate from the iron during the phenomenon of the boil, when ultimately it is consumed, as seen in the above table. The scoria or slag contains nearly the whole of the silicium, sulphur, and phosphorus existing in the pig iron.

I believe it will be useful to some members of this Society to be made acquainted with the composition of a mixture for welding iron and steel together, published by Mr. Rush. It is well known that the welding of these substances is not only difficult, but requires much skill from the workman who performs it. The process now followed consists in heating to a proper temperature the pieces of iron or steel to be welded, and then adding sand or a little borax on the surfaces, which, by dissolving the oxides of iron, renders the metallic surfaces clean and susceptible of welding. A Swiss workman some time ago found out, and used, with great advantage, a mixture for the above purposes, at the steel works of Durkheim, and Mr. Rust found this mixture to be composed of—

Borax	61·00
Sal ammoniac	17·25
Ferrocyanide of potassium	16·75
Rosin	5·00
	100·00

This composition being rather expensive, Mr. Rust was induced to make a series of experiments on this subject, and he succeeded in finding a cheaper and more effective mixture, which is composed of

Boracic acid	35·6
Common salt	30·1
Ferrocyanide of potassium	26·7
Rosin	7·6
	100·0

To weld steel with steel, he recommends the following proportions:—

Boracic acid	41·5
Calcined common salt	35·0
Ferrocyanide of pottassium	15·5
Anhydrous carbonate of soda	6·0
	100·0

Mr. Charles Lowe and myself, have lately found out a new method of stiffening fustian and other goods, which presents the following advantages over the old process, viz., that whilst it satisfies all commercial requirements, it is free from that noxious and offensive smell so well-known to all who have had to deal with fustians and other goods stiffened with putrid bone size. It consists in the employment of a mixture of vegetable substances. It is little liable to mildew. This process is now being extensively carried on by Messrs. Joshua Scholfield and Sons, of Manchester.

I cannot refrain from mentioning some valuable results, published by Professor William Thompson, of Glasgow, on the relative conducting power of various samples of copper wire from different manufacturers, and it will be seen by the following table that wires of the same diameter varied as much as 50 per cent. according to the quality of the metal of which they had been made. Professor Thompson, knowing how important it would be to Electric Telegraph Companies to ascertain the cause of this variation in conducting power, made a series of experiments by which he found that fractional quantities of various metals, added to copper, modified in a remarkable manner its conducting power, as shown in this table.

Conductibility of Copper Wire.

Test sample		100·
Later samples	(A) single wire	51·5
,, ,,	(A) strand	47·5
Last samples	(A) single wire	42·
,, ,,	(B) single wire	52·
,, ,,	(B) strand	58·7
,, ,,	(C) single wire	86·8
Two other manufactories:—		
	(E)	85· 71·3
	(F)	87· 85·
Common copper wires (purchased in Glasgow)		48·9 45·2 89·2
Silk covered wire (from Manchester)		53· 88·8

Specimens prepared by Messrs. Matthey and Johnson.

Pure copper				100·
Alloy of ditto, with	0·25	per cent.	silver	105·5
,, ,,	0·13	,,	,,	106·
,, ,,	0·25	,,	lead	109·9
,, ,,	0·13	,,	,,	111·2
,, ,,	0·25	,,	tin	99·8
,, ,,	0·13	,,	,,	101·4
,, ,,	0·80	,,	zinc	95·
,, ,,	0·40	,,	,,	91·7
,, ,,	1·40	,,	,,	78·5

In conclusion, allow me to draw your attention to the importance of establishing, in this country, a school or college for teaching chemistry as applied to the Arts and Manufactures. Nothing would tend more powerfully to benefit the commercial and manufacturing interests of the country than such an establishment, and I cannot but feel that there is no body of men in England so able effectively to promote this object, and to devise the best means of carrying it out, as this most useful and valuable Society.

DISCUSSION.

Mr. G. F. Wilson, F.R.S., hoped he might be allowed to correct a slight error made, he had no doubt, inadvertently by Mr. Crace Calvert, in one part of his subject. He had stated that the oleic acid, manufactured by Price and Co., at Vauxhall, was now made applicable for Turkey red dyeing, through the discovery of Pelouze. The use of oil in Turkey red dyeing, was too important a one to have been overlooked by Price's Patent Candle Company. After seeing the various results obtained from different samples of olive oil by the manufacturer's test, they investigated and discovered the cause, and described the use of oleic acid in a specification years before Mr. Pelouze's paper. While making this correction, he begged to say he entirely concurred with Mr. Calvert in his opinion of the value of Pelouze's discovery of the ferment acidification of oils. To all those engaged in experiments on fatty bodies, this discovery gave at once the clue to what had long been a great puzzle.

Mr. Pearsall wished to express the gratification with which he had listened to Mr. Crace Calvert's paper. With reference to the employment of soap in the process of sugar refining, and with regard to the use of sulphurous acid in the same process, he could not but admire the great caution with which Mr. Calvert had spoken of these new discoveries, abstaining from anticipating the results which time and practical experience alone could give. The manner in which views had been advanced upon discoveries not yet quite matured, was, in his opinion, an example worthy of imitation, and those who were merely acquainted with the theories of these new discoveries might derive a useful lesson from the way in which the method of employing sulphurous acid in the process of brewing had been gradually carried out to a successful issue. Amongst the many points introduced by Mr. Calvert, he thought none was more worthy of attention than the effects produced at different stages in the puddling of iron, as shown in the analyses taken at different times during the process; the results at each stage having been determined with the greatest nicety. One of the most striking facts introduced to their notice, was that with regard to the different conducting powers of copper wires in proportion to the alloys they contained. The results were certainly most extraordinary, and gave evidence of the advantage of complete examination at progressive stages of a process, the influence of very minute quantities of foreign matter being found to be so great.

Dr. PRICE would beg to make a few brief remarks in reference to that portion of Mr. Crace Calvert's interesting paper which related to the puddling of iron. He was induced to do so as he had, a few years since, in conjunction with his friend Mr. Nicholson, made a chemical investigation of the changes which took place during the refinery process. They found that in this operation the silicium was the first element that was oxidised, and that it was, as shown in Mr. Calvert's table, almost totally eliminated before the amount of carbon was materially diminished. The product of the refinery process known as "metal," might, in fact, be regarded as the purest kind of cast iron. Its hardness, however, prevented its being used for foundry purposes. It dissolved wrought iron with facility, and the product was steel. Steel had been made experimentally at Sheffield by this process, and with satisfactory results. With pig iron it mixed perfectly in every proportion, thereby enabling ironfounders to produce a cast iron of any quality. At present this process had not been carried out upon the large scale. The analyses of himself and Mr. Nicholson on the subject had not yet been published, but the facts mentioned had been embodied in patents for cast iron and cast steel, and noticed in some journals.

Mr. HYDE CLARKE expressed a hope that the suggestions thrown out by Mr. Crace Calvert, with regard to the study of applied chemistry, would not be lost sight of by this Society. Anyone who was in the habit of being brought into contact with working men in this country would see the difficulty there was in the way of their acquiring instruction in that branch of knowledge, and in this respect Mr. Calvert had drawn a striking contrast between the condition of the continent and of England. In foreign countries, every encouragement was given for the acquisition of such knowledge, whilst, in England, not only were the opportunities few, but many difficulties were interposed. Although there were good schools of chemistry, yet they were not upon that scale of liberality and practical application which rendered them available for the working man. A case had occurred under his own observation within the last few days in an establishment with which he was connected. A young man, by his talents and assiduity, had raised himself to be a foreman, and he had temporarily suspended his labours and had come from South America to this country, in order to enter upon the study of applied chemistry, with a view to perfect himself in the branch of manufactures in which he was engaged. He (Mr. Clarke) obtained his admission into the School of Mines, and he thought it was a pity that a young man who had displayed such earnest devotion as to travel from the other side of the globe for the acquisition of knowledge requsite for the practice of his art should be obliged to pay any fees at all. The great want of the present day was schools of chemistry, in which the working classes might be instructed in science, which might be applied to the several branches of manufactures in which they were engaged. If the suggestion thrown out by Mr. Calvert were followed up by the action of the Society, some small government grant might be obtained, which could be applied to this object.

The CHAIRMAN remarked that it was said by Sidney Smith, that every individual, however humble, had a perfect right to find fault, but that a man ought to have arrived at very considerable eminence before he should presume to praise. Were he to follow this dictum on the present occasion, it would place him in an awkward position, inasmuch as he was unable to find fault; he must either praise or say nothing at all. There was one point in particular which Mr. Calvert had illustrated in an admirable manner: that was the immense commercial good that arose from abstract studies. There could be no doubt that many of the points put forward that evening had arisen through the abstractedly scientific discoveries made by others. He need hardly allude tc a more marked instance of this than was afforded by the colouring matter called nitroso-phenyline. The discovery of this substance had resulted from the production of dinitro-benzole, dinitrocumole, and other similar compounds, which, at the time they were discovered, appeared useless as regarded their application to the arts and sciences, serving apparently merely to develope general laws, in the investigation of which scientific chemists were more especially interested. But now they found that the prosecution of these researches with a practical end in view, had resulted in the production of these magnificent colours from the oil of coal tar, varied in their hues according to the degree of oxydation or de-oxydation resorted to; but they would never have heard of these valuable productions but for the purely scientific researches of other chemists. This led him to remark upon the beautiful colouring matter produced from coal tar by Müller, called rosolic acid, the discovery of which, by Runge, was suffered to drop for a period of 20 years, having been, during that time, regarded with doubt and suspicion; but the researches of Müller had resulted in the obtaining of this magnificent purple colour by the action of lime on the vapours arising from coal tar. This dye was not at present of general application, but it was likely soon to become so, and he thought there was every probability of this rosolic acid being turned to useful account in manufactures. With reference to the remarks of Mr. Wilson, it was extraordinary how discoveries made many years ago were, after the lapse of time, brought to useful application. The purely scientific discovery of Chevreul, as to fatty matters being composed of fatty acids and glycerine, was almost day by day yielding fresh results, not only in scientific but also in applied chemistry. With reference to the admirable simplification in the production of sulphurous acid, described by Mr. Crace Calvert, it was matter of wonder that this plan had not been long ago adopted. The ordinary process was first to make sulphurous acid, then by a slow and expensive process to convert it into sulphuric acid, and then by another expensive process it was brought back again to the state of sulphurous acid. Why those tedious processes should have been so long employed, he was at a loss to conceive. He thought Mr. Crace Calvert had introduced to their notice the ultimatum of simplicity in the method of manufacturing sulphurous acid. There were many other points worthy of attention, which, however, he would refrain from touching upon, but he was sure they would agree with him, that the Society was deeply indebted to Mr. Calvert for bringing under their notice such a multitude of interesting new facts, each of which was sure to leave a distinct impression. He had great pleasure in proposing a vote of thanks to Mr. Crace Calvert, for his admirable paper.

The vote of thanks having been passed

Mr. CRACE CALVERT said, he felt highly honoured by the way in which his efforts that evening had been received, and he hoped he had been successful in interesting the meeting, and that the desire would be excited for further advance in these matters. Most of the discoveries he had mentioned were recent; where they had proved really successful he had stated it, and where any doubts existed as to their applicability he had not hesitated to mention them, and in this way he hoped to have the credit of perfect fairness. With regard to the process in the manufacture of iron alluded to by Dr. Price, the sole reason why he had not included it in the category of new discoveries arose simply from an unintentional oversight. He was aware of the improvements so introduced, and subscribed to their great merits and highly practical character. In effecting improvements in the manufacture of iron; they had a difficulty to deal with in the cheapness of the material itself, which rendered it necessary that all improvements made must be very simple and practical. These improvements had to be carried out by a large number of workmen, who were, in many cases, prejudiced, and inclined to opposed the introduction of any new process, which interfered with their preconceived notions, the ultimate benefit to the employer not being considered. He sincerely hoped that the hint he had thrown out as to the necessity which existed for having some proper institution for giving instruction in commercial chemistry in this country might be taken up by this Society. The Exhibition of 1851 showed them too plainly that in productions where art and chemistry came into play, in most cases the continental exhibitors carried off the palm. In fact, many branches of manufacture had been entirely diverted from this country to continental nations. The reason of this was, that the scientific and chemical education of the working classes was cared for in those countries, whilst in England it was totally neglected. In most parts of the continent facilities were provided for instruction in art and the applied sciences; hence their superiority in taste and in the production of that class of manufactures where chemical knowledge was brought to bear. It should be borne in mind that thirty years ago England had everything in her own hands, whilst the continent, being ravaged by war, had neither men, capital, nor the true spirit of commercial enterprise, and yet in thirty years' time foreigners came and carried away some of the medals in those departments in which England was once the mistress. How essential, then, was it to the maintenance of a high commercial position, that we should follow the good example offered to us by the continent, and so educate our rising generation in the application of science to the arts and manufactures, as to enable them to compete with other nations in the various markets of the world.

Mr. Crace Calvert showed numerous specimens, illustrating the various processes described in his paper.

The Secretary announced, that on Wednesday evening next, the 24th inst., a paper by Mr. W. Stones, "On New Zealand and its Resources," would be read.

The following letter has been received since the meeting:—

Sir,—Fully appreciating the importance of Mr. Crace Calvert's remarks "On the Puddling of Iron," I yet think it would be very advantageous to know more details of the experiments on the variation of carbon, &c., at different times and temperatures, as set forth in the table.

I should like, therefore, to inquire, if I may be permitted, through the medium of the *Journal*, whether the results noticed in Mr. Calvert's table are averages of a number of trials; whether the experiments were conducted at one place, with the same quality and (proportionally) amount of fuel and metal; and, lastly, if the temperatures attained were about the same.

I am, &c.,
WENTWORTH SCOTT.

7, Brunswick-terrace, Westbourne-grove,
Feb. 18, 1858.

YORKSHIRE UNION OF MECHANICS' INSTITUTES.

This union of Institutions for the moral and intellectual improvement of the population has now been in existence above twenty years, and during that time it has attained an importance and a magnitude which entitle it to be considered the first in the kingdom. It was established on the 11th December, 1837, at Leeds, and some idea may be formed of its progress from the following statement, showing the number of Institutions at each annual meeting:—

Date.	Place of Meeting.	Number of Institutes in the Union.	Number of Members.
1837	Leeds	13	2,641
1838	Leeds	14	2,418
1839	Leeds	—	—
1840	Leeds	11	1,795
1841	York	10	1,560
1842	Leeds	—	—
1843	Halifax	17	4,175
1844	Wakefield	20	4,581
1845	Bradford	22	4,953
1846	Huddersfield	23	5,594
1847	Sheffield	64	12,000
1848	Ripon	81	14,105
1849	Beverley and Hull	86	15,860
1850	Darlington	109	18,516
1851	Leeds	117	19,293
1852	Skipton	123	19,043
1853	Thirsk	127	18,537
1854	Bradford	128	20,105
1855	York	133	21,000
1856	Middlesborough	130	21,000
1857	Huddersfield	130	21,000

It will be observed by the foregoing statement that, although for the first few years the progress was discouraging, yet after 1842 its value began to be appreciated, and it has since made a steady advance, particularly during the past year, as several Institutions have been added to the union since the last annual meeting, and most of them are in better working order, there being a very favourable increase in the number of pupils of classes.

The principal objects in view in the formation of the Yorkshire Union were the improvement of existing Institutions, and the formation of new ones wherever an eligible opportunity presented itself. The chief means at first adopted were the annual meetings, and the conferences of delegates from Institutes within the Union, whereby there was an interchange of experience and much encouragement given to those who were zealously labouring for the mental improvement of their respective communities. The Union also published an annual report, which, in addition to many statistics, details, &c., of interest to Institutions, contained reports from the associated institutions, so as to bring together the statistics and experience of all.

In the year 1850 the Central Committee took an important step to increase its means of usefulness, and give additional vitality to the operations of the Mechanics' Institutes in Yorkshire by the appointment of a paid lecturer and agent, and the expenses have been met by an appeal to the nobility, gentry, and wealthy manufacturers of the county, many of whom are annual subscribers to the Special Agency Fund.

The affairs of the Union are under the management of a central committee which meets at Leeds, and the principal officers are:—Mr. Edward Baines (President), Mr. Henry Oxley (Treasurer), Mr. James Hole and Mr. James Kilson, junr. (Honorary Secretaries), Mr. Isaiah Dixon (Honorary Secretary of the Village Library), ten members of committee, of whom six are resident in Leeds and four are representatives of principal Institutes in Yorkshire, and Mr. Barnett Blake (Agent and Lecturer).

The Yorkshire Union comprises all Institutions which include amongst their objects the intellectual advancement of the operative classes, and in which scientific lectures are given. The terms of subscription are:—Institutes having less than 70 members, 5s. per annum; those having between 70 and 150 members, 10s. per annum; and those having 150 members or upwards, 20s. per annum.

An annual meeting of one delegate from each Institute having less than 200 members, and of two delegates from each Institute having 200 or more members, is held usually on the Wednesday in Whitsun-week, at some town in Yorkshire selected by the delegates at the previous meeting. The business transacted is the reading of the report of the committee, the election of officers of the Union for the ensuing year, the choice of the next place of meeting, and the discussion, as far as time will permit, of such subjects as may be of interest or likely to promote the successful working of the Institutes. The delegates afterwards dine together, and in the evening a public meeting is held, at which usually some nobleman of distinction takes the chair.

The report, which is published shortly after the annual meeting, contains the report of the committee and the business transacted at the annual meeting; several extracts from other publications on subjects of interest; a list of lectures by the agent, with terms and periods of visits to the several parts of the country; a list of 104 manuscript lectures which are lent to Institutes on payment of a small fee; a list of names and addresses of gentlemen who will give gratuitous lectures to Institutes in the Union; a list of professional lecturers, with their addresses, terms, &c.; a list of subscriptions to the Union, treasurer's account, &c.; and a copious appendix containing, in alphabetical order, reports from the several Institutes in the Union. It concludes with a carefully prepared tabular view of the Institutes, showing in parallel columns the number of members in each, increase or decrease from the previous year, average of members to population, rates of subscription, annual income, number of books in each library, number added during the year, extent of circulation, periodicals in reading-rooms, distinguishing weekly, monthly, quarterly, and newspapers. Lectures delivered during the year, distinguishing paid and unpaid, also scientific, literary, and musical, and members of pupils in classes, stating the subject taught and the average attendance of each.

The services of the agent are devoted to delivering lectures at such Institutes as may require them, speaking at soirées or public meetings in behalf of Institutes, conferring with Committees of Institutes whenever they may require his advice, visiting places where an opportunity may present itself for the formation of an Institution, and assisting in such formation wherever his services may be required. In cases of lectures or attending soirées, his travelling expenses are paid by the Institute inviting him, but in other services his expenses are paid by the Union.

The Yorkshire Union also possesses a library for circulation in villages and small towns, the object being to provide the means where they do not exist for encouraging a taste for a better class of literature than is usually within the reach of the inhabitants of such localities. It comprises 45 sections, each containing 50 volumes, judiciously assorted, and the terms are a subscription of 1d. a week, or 1s. a quarter; 25 subscribers being entitled to one section, 50 subscribers to two sections, and so on in proportion, 10 per cent. being allowed to the local librarian for his trouble, and the expense of carriage being paid by the Union.

The committee have also recently purchased, at a cost of £50, an apparatus for the exhibition of dissolving views and the oxy-hydrogen microscope, the objects being of an instructive rather than of an amusing character, the chief design being to excite attention to the wonders of nature and art, and to promote a desire for mental improvement in communities which cannot otherwise be successfully appealed to.

Every year a parcel is forwarded to each Institute in the Union containing copies of the report, and such publications, official returns, and other documents as may be sent to the committee for distribution to the several libraries and reading-rooms.

One of the great advantages of the Union is the facility for organisation, and obtaining an expression of public opinion whenever united action may be desirable. It is a centre from which communication may at all times be made with all the Institutions in Yorkshire, and where advice or assistance may be sought in the promotion of any steps for the mental improvement of the operative classes.

The value and importance of the Yorkshire Union have been abundantly proved in the immense increase which has taken place, not only in the number of Mechanics' Institutes in Yorkshire, but in the really practical working of them, as shown in the number of candidates for certificates at the Examinations of the Society of Arts at Huddersfield. The labours of the agent are devoted not only to the delivery of lectures and to taking part in the proceedings of annual soirées, but also to visiting the several localities, and by advice and suggestions founded on long experience, assisting to remove obstacles to success, and pointing out increased means of usefulness. The extent of his labours may be shown by the last report, which states that during the previous year he had delivered 113 lectures, spoken at 31 soirees, and made 86 other visits to Institutes or places where an opening appeared to present itself.

If any further proof were needed of the advantage arising from the promotion of mental cultivation and the spread of intelligence amongst the operative classes, it might be adduced from the experience of the last few months. The recent monetary panic has caused thousands to be thrown out of employment, and yet in no case has it been found necessary to call for additional aid to maintain the public peace. No longer guided by the mere impulse of passion, the operative classes have shown themselves accessible to reason, and amply justified the labours which have been bestowed so prominently by the Yorkshire Union to promote their moral and intellectual prosperity.

The following are the rules of the Yorkshire Union Itinerating Village Library:—

1. That a series of Libraries be formed, to be called "The Itinerating Village Library," for the purpose of lending books to the inhabitants of villages where no Institution or local library exists, or where other circumstances render it desirable.

2. That the subscription requisite to constitute a subscriber to the library be 1d. per week, or 1s. per quarter, paid in advance, and that the number of subscribers requisite to constitute a library station be not less than twenty-five. That, wherever practicable, the sum of £3 be also raised at each station towards the original cost of the books.

3. That the control and management of the Library be intrusted to a Committee, consisting of the Central Committee of the Yorkshire Union, together with one delegate elected by the subscribers at each of the stations, where there are not less than fifty subscribers. That this committee shall meet at least once every three months, three to be a quorum. The committee shall select and purchase books, and solicit donations of money and books for extending the operations of the library. They shall be empowered to engage a general librarian, the local sub-librarians, and such other officers as may be requisite; to fix the period for which each book shall be lent, and the amount of fine for neglecting to return it at the spe-

cified period; and generally to pass such bye-laws as may be requisite for the proper management of the business entrusted to them. The seat of the committee to be in Leeds.

4. At each station where there are fifty subscribers or upwards, the subscribers shall have the right of annually electing one representative to the annual meetings of the Union. The meeting of the subscribers for this purpose to be summoned by the local librarian, one month previous to the annual meeting of the Yorkshire Union of Mechanics' Institutes; and the name of the delegate appointed to be immediately sent to the Secretaries of the Yorkshire Union.

5. That the duties of the general librarian shall be to purchase the books ordered by the Committee; to submit all donations of books to their sanction; to obtain catalogues of books from the various booksellers and publishers; to see that all books issued to the local stations are in proper condition, and stamped with the Union stamp, and generally to watch over the interests and discharge the duties connected with the Library. The remuneration for his services to be determined by the Committee.

6. That the duties of the local librarian shall be to issue books to the subscribers, and receive them back, keeping a record of the same; to receive the subscriptions and hand them over, with a list of the subscribers verified by the auditors, to the cash secretary, every three months; to see that any books lost or damaged by a subscriber are replaced by him; to forward the sections half-yearly to Leeds, or such other place as the Committee may direct; and to canvass for new subscribers in his district. That an acknowledgment be made to the local librarian of one-tenth of the subscriptions received by him, except when otherwise determined by the Committee. The librarian at each station shall be provided with a book for registering the issues of the books under his charge, and another for keeping an account of subscriptions and fines, and that the entries be made, and the accounts kept, and the same presented to the Central Committee; and that as often as the latter shall direct, both, or either, of the books shall be sent for their inspection, and shall at all times be open to the examination of an auditor appointed by the subscribers.

7. That the cash secretary receive and examine the accounts from the local librarians, and pay all monies into the hands of the treasurer of the Yorkshire Union of Mechanics' Institutes, who shall keep a distinct account of the same.

8. That the library be divided into sections, each containing fifty volumes, and that the sections be distributed among the stations in the following proportions:—

Stations containing	Shall be entitled to
25 or more subscribers......	1 section or 50 vols.
50 ditto.	2 ditto. 100 do.
75 ditto.	3 ditto. 150 do.

Or in the above proportion, and so on; every additional twenty-five subscribers being entitled to an additional section of fifty volumes. The section to be changed every six months.

9. Each section of fifty volumes to contain a well-selected variety of books, so as to be (as far as possible) complete in itself. No volumes belonging to one section to be intermingled with those of another section. All volumes issued to the stations to be progressively numbered, and stamped with the words "Y. U. Itinerating Village Library, section A, B, C, D," &c. All additions to the library to be reserved until the number and variety are sufficient for a complete section.

10. That in order to protect the property, the libraries shall be vested in the following seven trustees, elected, in the first instance, by the Central Committee:—W. F. Hook, D.D., Edward Baines, John Hope Shaw, James Kitson, Wm. Crowther, Thos. Dawson, and James Hole. Whenever the number of trustees is reduced to three, the Central Committee and delegates shall elect four additional trustees to supply the vacancies.

All applications for libraries, and all payments on account of the library, or communications in reference to them, to be made to Mr. Isaiah Dixon, Hon. Librarian and Cash Secretary, Mechanics' Institution, Leeds.

*** All books, when exchanged, to be returned to Mr. Duthie, 17, Albion-street, Leeds.

SOUTH KENSINGTON MUSEUM.

During the week ending 13th Feb., 1858, the visitors have been as follows:—On Monday, Tuesday, and Saturday, free days, 3,056; on Monday and Tuesday, free evenings, 3,756. On the three Students' days (admission to the public 6d.), 1207; one Students' evening, Wednesday, 349. Total 8,368.

Home Correspondence.

STEAM CULTIVATION.

SIR,—I did not, as reported in the *Society of Arts Journal*, state that I employed my steam machinery upon an average 39 days in the year, but that I had used it 39 days in the two years from January 30, 1856, down to the present time.—I am, &c.,

W. SMITH.

Woolston, Feb. 14, 1858.

SIR,—I much regret the discussion on Mr. Clarke's paper on steam-ploughing was not adjourned, the more so, as, from the interest excited, as shown by the number of agricultural gentlemen present, doubtless, many valuable facts relating to the benefits of deep cultivation would have been brought forward, which would have cheered inventors in their exertions.

Having been engaged for Mr. A. D. Lacy, of Thirsk, for upwards of twelve months, in maturing the details for the patent numbered 2,641, of the year 1855, I will venture to enter my protest, on the part of Mr. Lacy in particular, and of the various patentees in the line of cultivating by steam in general, against Mr. Fowler's insinuation that it is necessary, for the progress of the subject, that the public should render aid, other than patronage when the inventions are perfected. We doubt not, ample tangible remuneration will be the lot of those who succeed, by their inventive faculties, in rendering the slightest assistance to the good cause, even though they are not enabled to secure by patent the particular invention they introduce to the public.

This, I believe, is now the case with Mr. Fowler; as, if I read the drawings on the walls of the Institution aright, he comes now to the application of the capstan for actuating an endless rope. It is true, he has adopted in that design the form with two grooved drums, known by the practical mechanic as having been applied by Messrs. Sharp and Roberts in their pillar cranes.

In the patent numbered 1,989, of the year 1857, it will be found that we claim the application of the capstan, in this and other forms, to the actuating of the necessary ropes or chains used for conveying motion to agricultural implements, but disclaiming it when the rope is endless. I wish to put on record our reason for the disclaimer, this having been simply Lord Willoughby D'Eresby's publication and mode of operations.

Doubtless, Mr. Fowler's plan is an improvement in detail on Lord Willoughby D'Ercsby's, as shown in his publication, on account of the increased diameter of drums; but, having studied the question, I may venture an opinion, that Mr. Fowler, even if using the endless rope, will yet come back to the single ungrooved capstan system, properly proportioned, working upon a vertical axis, and having guide discs, &c., as shown in the detailed drawings of the patent numbered 1,989, of the year 1857, or some other efficient method of fleeting the rope, &c.

The reasons for entertaining this opinion will be evident to the practical mechanic examining the subject, on account of the undue bending and straightening of the rope when the double cylinder capstan is employed.

Doubtless, much money and time have been spent in bringing the application of the rope-traction system to its present state of efficiency; but I yet think that it must be with a rope of considerable length, used as proposed in the first instance, in the respective patents of Messrs. Lacy, of Thirsk, and Smith, of Woolston, and practised by Mr. Fowler in his first endeavours, thus avoiding the shifting of the engine for less than say 10 acres of land ploughed.

When the drum is used, having the rope coiled and uncoiled from on and off it, it becomes difficult to apply the motive-power in a constant form, from the difference in the working diameters of the coil on the barrel; this inconvenience was, doubtless, found very great, but perhaps not more so than that arising from the immense wear and tear caused by the rope coiling on the top of itself, with a tension of, say a ton. Again, this was greatly enhanced by the absence of any apparatus to cause the rope to coil regularly on the drum—at least, this was a defect I noticed in any machinery I have seen at work; but, in mentioning this, I do not consider it an oversight by the constructors, as practical experience in the use of ropes for other purposes, has taught me the great difficulty of getting any such apparatus to act efficiently when a great strain is on the rope.

It is not for me here to refer to the details of patent number 1989, of the year 1857, but, I do hope, sir, if my health be spared, to be able, before this year is out, to lay before your Society the details of the experiments contemplated when the first set of machinery, under that patent, is completed, which, I trust, will be the case in the course of a couple of months.

I fear I may weary you with the length of this communication, or I would make some remarks upon the rotary digging system, but, as it is, I will content myself by assuring you there is at least one inventor not despairing of success or in want of remuneration till his task be completed. I will only remark further, there are reasonable grounds to anticipate that the prognostications of the judges of the Stirlingshire Agricultural Society will be fulfilled. They say in their report on steam-ploughing to that Society:—"In the progress of improvements, it may not be far distant when the engine will be enabled to do its work efficiently, without the necessity of leaving a corner of the field, and thereby obviate the disadvantage of moving over it."—I am, &c.,

WM. COLLETT HOMERSHAM.

1A, Adelphi-terrace, Feb. 15, 1858.

Proceedings of Institutions.

Hanley (Staffordshire).—A conversazione of the members, exclusively, was held in the lecture-hall of the Pottery Mechanics' Institution, on Tuesday, 9th February. The meeting was numerously attended, and the proceedings were diversified by an exhibition of paintings, engravings, and other works of art, articles of vertu, &c. There were two brief addresses, one by Mr. Charles Alfieri, on "Photographic Art," the other on the "Geology of the locality," by Mr. John Scott. Some performances were given by an Amateur Musical Company.

PARLIAMENTARY REPORTS.

PRINTED SESSIONAL PAPERS.

Parl. No.

Delivered on 8th February, 1858.

8. Bill—London Corporation.
Foreign Refugees—Paper.
Bank of England—Copy of Letter.

Delivered on 6th February, 1858.

26. East India (Mutinies)—Copies of Letters.

Delivered on 9th February, 1858.

37. Naval Receipt and Expenditure—Account.
Riots in Belfast—Report of the Commissioners.
Mutinies in India—Letters from the Court of Directors.
Bessarabian Frontier, &c.—Treaty.
Prussia (Marriage of H.R.H. the Princess Royal)—Treaty.
Sardinia (Post-office Arrangements)—Convention.

Delivered on 10th February, 1858.

29. Public Income and Expenditure (Balance Sheet)—Account.
48. Bank of England—Copy of a Letter.
50. East India Company (Receipts and Disbursements)—Estimate.
12. Bill—Lady Havelock and Sir H. M. Havelock's Annuities.
Foreign Refugees—Despatch from Count Walewski's to Count de Persigny.

Delivered on 11th February, 1858.

27. Navy Estimates.
30. Factory Children (York and Lancaster)—Returns.
33. East India (Bishops and Cathedral Establishments, &c.)—Return.
35. East India (Steam-ship *Austria*)—Return.
36. Metropolitan Improvements—Statement of Advances.
38. Lunacy—Account.
39. Post Office Department (Packet Service)—Estimate.
43. Court of Session (Scotland)—Return.
45. Lighthouse at Godrevy—Return.
6. Bills—Heirs (Scotland).
7. ——— Valuation of Lands (Scotland) Act Amendment.
13. ——— Gaols and Houses of Correction.
14. ——— Portumna Bridge (Ireland).
Certified Industrial and Ragged Schools—Minute of the Lords of the Committee of Privy Council on Education.
East Indies (Mutinies)—Appendix (B) to further Papers (No. 5).

Delivered on 12th February, 1858.

32. East India (Civil Service)—Return.
34. Paper Duties—Returns.
42. Poor Relief (Scotland)—Return.
53. Justices of the Peace (Ireland)—Copy of a Letter.
58. East India (Sepoy at Meerut)—Copy of Papers.
59. East India (Cadetships)—Return.

Delivered on 13th and 15th February, 1858.

55. Savings Banks—Return.
66. Army Estimates.
30 (1). Factory Children (County of York)—Beturn.
41. Burial Grounds (Metropolis)—Return.
75. East India (Improvements in Administration)—Return.
16. Bills—Ecclesiastical Residences (Ireland).
17. ——— Churches, &c. (Ireland).
18. Church Rates Abolition.
10. Clerks of Petty Sessions (Ireland).

Delivered on 16th February, 1858.

56. East India (Military Force)—Return.
68. Trade and Navigation—Accounts (31st December, 1857).
76. Bank of England—Annual Accounts.
11. Bills—Markets and Fairs (Ireland).
15. ——— Conspiracy to Murder.
Sanitary Condition of the Army—Report of the Commissioners

MEETINGS FOR THE ENSUING WEEK.

Mon. Actuaries, 7.
Architects, 8. I. Mr. S. Smirke, "A brief Communication on the subject of Water Supply in Towns." II. Mr. G. R. Burnell, "On the Modern Applications of Hydraulic Limes and other Cementitious Materials to constructive purposes."
Geographical, 8½. I. Mr. Cyril C. Graham, "Explorations in the Desert of the Hauran." II. Mr. Alfred R. Wallace, "Account of the Arru Islands." III. Capt. J. Ballemy, "Extract of the Journal of the schooner *Eliza Scott*.'
Tues. Royal Inst., 3. Prof. Huxley, "On Biology."
Civil Engineers, 8. Mr. F. C. Webb, Assoc. Inst. C.E., "On the Practical Operations connected with the Paying-out and Repairing of Submarine Telegraph Cables."
Med. and Chirurg., 8½.
Zoological, 9.
Wed. Royal Soc. Lit., 4½.
Society of Arts, 8. Mr. W. Stones, "On New Zealand and its Resources."
Geological, 8. I. Signor G. G. Gemmellaro, "On the Gradual Elevation of a part of the Coast of Sicily." II. Mr. K. Macnab, "On the occurrence of Sea-shells in a Peat-moss at Abernethy." III. Mr. T. F. Jamieson, "On some striated Stones and Sea-shells at high levels in Scotland." IV. Mr. R. Mason, "On Changes of Level in the country near Tenby."
Archæological Asso., 8½.
Thurs. Royal Inst., 3. Prof. Tyndall, "On Heat."
Royal Society Club, 6.
Numismatic, 7.
Antiquaries, 8.
Royal, 8½.
Fri. Royal Inst., 8½. Prof. Baden Powell, "On Rotatory Stability, and its Applications," illustrated by the apparatus of Prof. C. Piazzi Smyth.
Sat. Royal Inst., 3. Prof. Bloxam, "On the Chemistry of the Elements which circulate in Nature."
Medical, 8.

PATENT LAW AMENDMENT ACT.

APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

[*From Gazette, Feb.* 12, 1858.]

Dated 23*rd December*, 1857.

3148. William Nunn, Hackney, Middlesex—Improvements in stereoscopic apparatus.

Dated 7*th January*, 1858.

26. François Philippe Cappon, Marans, France—Self-acting pads for doors, shutters, windows, or other similar shuttings.

Dated 18*th January*, 1858.

80. Richard Archibald Brooman, 166, Fleet-street—Improvements in machinery for the manufacture of pipes and tubes. (A communication.)

Dated 23*rd January*, 1858.

125. Charles Fréderic Vasserot, 45, Essex-street, Strand—A single and double acting machine with electro-magnetic motive power. (A communication.)

Dated 26*th January*, 1858.

137. Pearson Hill, Hampstead, Middlesex—Improvements in machinery for making cams and for cutting and shaping metals and other materials.
139. George Price Simcox, Hendham Vale Works, Harpurhey, near Manchester—The application of certain materials in the manufacture of carpets.
141. William Edward Newton, 66, Chancery-lane—Improved machinery for mining coal and other mineral substances. (A communication.)
143. William Davis Hirst, Mount-street, Grosvenor-square—A stand for soda-water bottles and other bottles of a similar form.
144. John Harthan and Ezra Harthan, Timbersbrook, near Congleton—An improved engine for obtaining motive power.
145. Ralph Heaton, jun., and George Heaton, Birmingham—An improvement or improvements in annealing metals.

Dated 27*th January*, 1858.

147. Arthur Bird, Birmingham—A new or improved spring platform or mattress for bedsteads and other articles used for sitting, lying, or reclining upon.

George James Wainwright, Dukinfield—Improvements in drawing fibrous materials.

149. John Wignall Midgley, Keighley, Yorkshire—An improved construction of covered roller to be used in preparing and spinning machinery.

Dated 28*th January*, 1858.

150. James Murdoch Napier, Vine-street, York-road, and Wiiliam Thorburn, 19, Sussex-place, Vine-street, York-road—Improvements in machinery for planing, shaping, and slotting.
151. Constantine Nicolaus Kottula, Liverpool—Improvements in the manufacture of neutral soap.
153. Louis Caemmerer, Ghent, Belgium—Improvements in the apparatus for cleaning the top rollers and fluted rollers of the different spinning machines.
154. William Spence, 50, Chancery-lane—An improved pot for chimneys and ventilation. (A communication.)
155. Edmond Liouvil, Paris—Improvements in apparatus for aerated liquids.
156. John Henry Johnson, 47, Lincoln's-inn-fields—Improvements in the manufacture of metal pipes, and in the apparatus employed therein. (A communication.)
157. Thomas Armitage, Hood-street, Coventry—Improvements in elastic fabrics.

Dated 29*th January*, 1858.

158. William Treleaven Fox, Birkenhead—Improvements in the bending and reefing of ships' and other vessels' sails, together with a new application for the leeches and foot.
159. John Bethell, 8, Parliament-street, Westminster—Improvements in the manufacture of coke and fuel.
160. William Henry Tooth, 9, Summer-street, Southwark—Improvements in polishing plate glass, sheet glass, and other substances.
162. John Elder, Glasgow—Improvements in the arrangement or construction of steam engines and boilers.
163. George Chapman, Leicester—An improvement in socks, drawers, and other garments made of knitted fabrics.
164. Richard Archibald Brooman, 166, Fleet-street—Improvements in apparatus for measuring water, gas, and other fluids. (A communication.)
165. Robert Ware, Plumstead, Kent—Improvements in galvanic batteries.
166. James Wotherspoon, Glengarnock Iron Works, Ayr, N.B.—Improvements in railway brakes.
167. James Goodwin, Milton, N.B.—Improvements in the treatment, preparation, and cleansing of textile fabrics and materials.
168. Herbert William Hart, Birmingham—Improvements in regulating the pressure of gas.

Dated 30*th January*, 1858.

169. William Kaye and Charles Kaye, Lockwood, near Huddersfield—Improvements in mattocks, picks, hoes, hammers, and similar implements and tools.
170. George Garden Nicol, 37, New Broad-street—Improvements in balls or projectiles. (A communication.)
171. Charles Niellon, 50, Lime-street—Improvements in the manufacture of manure from sewage waters.
172. John Newling, Park-street, Grosvenor-square—An improved truss for hernia.
173. Richard Coleman, Chelmsford—Improvements in agricultural implements.
174. John Augustus Bouck, Manchester—Improvements in the manufacture of sulphate of copper, and in obtaining certain useful products from such manufacture.
175. Thomas Taylor, senr., Thomas Taylor, junr., and Henry Nelson, Manchester, and Henry Spencer, Rochdale—Improvements in steam engines, and apparatus connected therewith.
176. Peter Ashcroft, Engineer to the South Eastern Railway—An improved mode of supporting the rails of railways in their chairs.

Dated 1*st February*, 1858.

178. William Kemble Hall, 36, Cannon-street—Improvements in the manufacture of artificial leather.
180. George Bartholomew, Linlithgow, N.B.—Improvements in horse shoes, and in attaching the same to the horses' feet.
182. William Edward Newton, 66, Chancery-lane—An improved clasp or fastening for joining the ends of belts or bands. (A communication.)
184. Richard Archibald Brooman, 166, Fleet-street—Improvements in burners for generating and burning gas from hydro-carbon fluids. (A communication.)
186. William John Hay, Southsea—An improved composition suitable for covering the caulking of ships and other like purposes, for uniting wood and other substances, for filling up seams, and for use as a waterproof composition generally.

Dated 2*nd February*, 1858.

188. William Edward Newton, 66, Chancery-lane—Improvements in obtaining certain compounds of nitrogen to be applied in the composition of artificial manures, and for other useful purposes. (A communication.)
190. James Sholl, Victoria-grove West, Stoke Newington—Improvements in the manufacture or preparation of paper for writing and copying purposes.

WEEKLY LIST OF PATENTS SEALED.

February 12*th*.

2158. William Smith Wheatcroft and James Newton Smith.
2159. John Alleyne Bosworth.
2167. Charles Gumm.
2169. Samuel Draper.
2190. William Heny Miller and Henry Edward Skinner.
2194. Thomas Keddy.
2214. Amos Pierce Chamberlain.
2272. François Xavier Gentil, senr., and Eugène Gentil, junr.
2284. William Clark.
3044. Samuel Clarke.
3080. Edwin Turner and John Charles Pearce.

February 16*th*.

2179. Archibald Smith.
2191. Charles Nightingale.
2196. Samuel Bottomley, James Bottomley, and Thomas Bottomley.
2200. Pier Alberto Balestrini.
2204. Ferdinand Potts.
2208. James Murdoch Napier.
2212. Rd. Archibald Brooman.
2217. Thomas Ingram.
2219. Joseph Glover and J. Bold
2221. Victor Hippolyte Laurent.
2222. Peter Ashcroft.
2223. Henry Cartwright.
2225. Jules Dufau.
2233. Ludwig Levison.
2239. Alfred Hamilton.
2241. Thomas Macauley.
2267. William Harling, John Matthew Todd, and Thomas Harling.
2286. George Hallen Cottam and Henry Richard Cottam.
2295. Robinson Elliott.
2308. Perry G. Gardiner.
2310. John Yuil Borland.
2332. William Lewis and William Henry Lewis.
2371. Charles Lungley.
2687. John B. Slawson.
2777. George Hallen Cottam and Henry Richard Cottam.
2238. George Lowry.
2995. Joseph Francis and Charles Manby.
3054. John Chadwick and Arthur Elliott.
3111. Samuel Darling.
3112. Charles Winslow.

PATENTS ON WHICH THE STAMP DUTY OF £50 HAS BEEN PAID.

February 8*th*.

308. William Beckett Johnson.
322. John Ramsbottom.
335. John Henry Johnson.
346. Christophe-François Delabarre.

February 9*th*.

313. Edward Sparkhall.
321. George Rennie.
327. Richard Shirley Harris.

February 11*th*.

328. John Foster.
431. Alex. Theophilus Blakely.

February 12*th*.

355. Samuel Barlow Wright and Henry Thomas Green.

WEEKLY LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

No. in the Register.	Date of Registration.	Title.	Proprietors' Name.	Address.
4056	Feb. 12.	The Hand Seed Planting Machine	Joseph Hoare	Old Fishbourne, Rosham, Sussex.
4057	,, 13.	The Improved Sheep Shears	Robert Sorby and Sons	Sheffield.
4058	,, 16.	Life Preserver	James Armstrong	Irthington, Cumberland.
4059	,, 17.	Spring Hat Suspender	James Chesterman	Sheffield.